

WE CLAIM:

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1. A method of producing a human mitotic kinesin protein excluding Kid comprising a motor domain comprising:

expressing a nucleic acid comprising a nucleic acid encoding a human mitotic kinesin protein comprising a motor domain in a bacterial cell and

10 substantially purifying said human mitotic kinesin protein.

2. A method of producing a human kinesin protein comprising a motor domain comprising:

expressing a nucleic acid comprising a nucleic acid encoding a human kinesin protein comprising a motor domain in a bacterial cell and

15 substantially purifying said human kinesin protein, wherein said kinesin protein is selected from the group consisting of chromokinesin, KSP, CENP-E, MKLP1, HSET, Kif15, Kin2, Kif1A and MCAK.

20 3. A method of producing a human kinesin protein comprising a motor domain and at least three epitope tags comprising:

expressing a nucleic acid encoding a human kinesin protein comprising a motor domain in a bacterial cell and

substantially purifying said human kinesin protein.

25 4. The method of Claim 3 wherein KHC is excluded.

5. A method of producing a kinesin protein comprising a motor domain comprising:
expressing a nucleic acid encoding a kinesin protein comprising a motor domain in a
bacterial cell and
substantially purifying said kinesin protein, wherein said kinesin is selected from the
5 group consisting of Kin2, chromokinesin, HSET, Kif15, Kif1A, BimC and MKLP1.

6. A substantially pure unglycosylated human mitotic kinesin protein excluding kid
comprising a motor domain.

10 7. A substantially pure unglycosylated human mitotic kinesin protein, wherein said kinesin
protein is selected from the group consisting of chromokinesin, KSP, CENP-E, MKLP1, HSET,
Kif15, Kin2, Kif1A and MCAK.

15 8. A substantially pure unglycosylated human kinesin protein comprising a motor domain
and at least three epitope tags.

9. A substantially pure unglycosylated kinesin protein comprising a motor domain, wherein
said kinesin is selected from the group consisting of Kin2, chromokinesin, BimC, HSET, Kif15,
Kif1A and MKLP1.

20 10. A bacterial cell comprising a nucleic acid comprising a nucleic acid encoding a kinesin
selected from the group consisting of chromokinesin, BimC, HSET, Kif15, Kin2, and Kif1A.

25 11. A bacterial cell comprising a nucleic acid comprising a nucleic acid encoding a human
kinesin selected from the group consisting of chromokinesin, Kin2, BimC, Kif1A, KSP, CENP-E,
MCAK, HSET and Kif15.

12. An assay to identify a candidate agent which binds to a kinesin protein of claim 6, 7, 8, or 9 comprising:

combining a candidate agent with a kinesin protein of claim 6, 7, 8, or 9 and determining whether binding occurs.

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13. An assay to identify a modulator of a kinesin protein of claim 6, 7, 8, or 9 comprising:

detecting activity of a kinesin protein of claim 6, 7, 8, or 9 in the presence and absence of a candidate agent wherein a change in activity indicates a modulator.

10 14. The assay of claim 13 wherein said activity is ATPase activity and/or microtubule binding or gliding.

15. A substantially purified unglycosylated peptide selected from the group consisting of K335, Q475, D679, FL1, P166, H195, FL2, E433, R494, E658, L360, K491, S553, M329, T340,

15 S405, V465, T488, M1, M2, M3, M4, M5, M6, FL3, A2N370, A2M511, K519, E152.2, Q151.2, Q353 and M472.